

Ontology by Linking

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August 11, 2005[†]

Abstract

This is a rough, tentative sketch of some of my ideas for an antifoundationalist ontology, a loose collection of remarks, not an argument. If foundationalist ontology, ‘ontology by founding’ (which attempts to specify the ultimate building blocks of the world), doesn’t work, an ‘ontology by linking’ might still be informative. This would be somewhat like giving implicit definitions for concepts which can’t be explicitly defined, comparable, I think, to Dennett’s stance stance or to the characterization of theoretical entities in physics.

I propose to conceive of properties and relations (‘universals’) as *recognizabilia*, as whatever it is physical agents can (in principle) recognize. A universal and its intension would be characterized by specifying a mechanism an agent might use to recognize instantiations of that universal, and taking recourse to the function such a mechanism has for the given agent. In general, ontological categories like “universal” or “particular” would be more-or-less-natural kinds, namely, ways of carving chunks from nature. I further suggest that particulars are parts of the world individuated by certain characteristic universals – but not always in a squeaky-clean way: under very unnormal circumstances our individuation criteria break down (e.g., Theseus’ ship). They will in general also have fuzzy space-time boundaries (cf. Unger’s Problem of the Many), which is nothing to worry about, however.

Universals are what can (in principle) be recognized by agents, they are the ‘*recognizabilia*’. To be more precise: what characterizes a universal *u qua* universal is not that *u* itself can be recognized ‘as a universal’ by some agent, but rather that *instantiations* of *u* can be recognized as such by some agent. What can be recognized by agents are (instantiations of) *patterns*¹ or structure (in a wider sense than the one used in mathematics and its philosophy). So the universals are the patterns. My account of universals is based on pattern recognition in a broad sense.

In talking about patterns there is an ambiguity: in ordinary language we sometimes conflate patterns and their instantiations. Talking about a wall we say: “There was a pattern on that wall”, where it would be more precise to say: “There was a pattern instantiated on that wall”. When we ask of someone: “Please erase that X-pattern on the wall there”, we do not expect her to remove the pattern itself (that way of being patterned or structured) from existence; rather we want its instantiation removed, say,

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[†]Slightly modified and extended September 4, 2013.

¹Not in the murky sense introduced by Resnik (1997); cf. my 2005, Sect. 2.1.

we want certain particles of pigment removed from the wall. Some similar conflation maybe occurs when one says, following Frege, that existence is a property of concepts (or universals): One doesn't of course mean thereby to propagate the enunciation of things like "The concept *horse* exists" and "The concept *unicorn* doesn't exist". Rather, one is thinking of sentences like "There are horses" and "Unicorns don't exist", where one is grammatically predicating (non)existence of the *instantiations* of concepts in order to express certain properties of the concepts themselves, viz., (non)emptiness. I will sometimes use this convenient shorthand of speaking of patterns 'in the world', but this is always supposed to refer to instantiations of those patterns. I hope no confusion arises.

There is a lot of follow-up questions:

1. What are patterns?
2. What is an agent?
3. What is recognition of (instantiations of) patterns by an agent?
4. What is "in principle" supposed to mean?

There is no more informative answer to the first question than that patterns are whatever can in principle be recognized by agents. Nevertheless I think that my account gives an informative answer to the question *what are universals*. The most informative kind of answer to this question one might hope for would have the form of an explicit definition:

u is a universal iff u is an X with the following properties: . . . ,

where "X" is a general term even more general than "universal", expressing a concept even more basic. Well, "entity" might be a candidate, but that would presuppose that universals exist. Such an explicit definition can only be in some way circular and thus uninformative and useless.²

So, if we desire an informative answer to the question of what are universals, we shouldn't set our hopes *too* high: ontology by 'founding' doesn't work. But something a little more modest is possible: elucidating the concept of universals by linking it in an informative way to concepts we are more at home with, namely, concepts of everyday language and science. Particularly, I am thinking of the concept of a physical system, the concept of a system's function (in the teleological sense; cf. Dennett's design stance), the concept of an agent (e.g., organisms, automata) – and what else? There is no agreement about what are proper explications of the teleological notions, but we can use these notions reasonably well anyway. This will have to suffice for getting off the ground.

The answer I want to give will be more like an implicit definition, like an axiomatic characterization, though not as precise and clear as they are in mathematics. This is what I believe Dennett's 'stance stance' amounts to: he elucidates the teleological and the intentional terms, not by giving explicit definitions in terms of the physical stance, but by giving implicit definitions which link the teleological (resp., intentional) terms to each other and to physical terms, thus delimiting their reference. (Alas, Dennett doesn't make these implicit definitions explicit.) The connection to physical or everyday terms marks a further difference to mathematics: an axiomatic characterization in mathematics leaves it much more open what kind of entities falls under it; these

²See my 2003, Sect. 1.

entities are only required to have certain kinds of relation among each other, not to specific everyday objects.

Universals are patterns; and patterns are recognizabilia, they are whatever it is that agents can recognize. By linking the concept of universals to the reasonably-well-understood concept of pattern recognition,³ we get the chance to understand universals somewhat better. For example, what does it mean to say that a certain universal exists, or that universals in general do or do not exist? Obviously universals can't exist in quite the same way as everyday objects like tables and trees exist:⁴ we can't see or touch them, they are not located in space or time. How about the comparison between universals and theoretical entities of physics like electrons? I feel safe assuming that the latter exist, in a sufficiently good sense (even though I cannot see or touch them), because the physical theories which postulate them work very well. The characterization of these theoretical entities by physical theories is also an example for the kind of implicit definition I propose: they are characterized via certain structural/relational properties, on the one hand, and via their postulated connection to the physical behavior of macroscopic objects, on the other.

I propose to say that a certain putative universal exists iff there might be an agent which can in principle recognize instantiations of this universal. To corroborate such a claim one would have to specify a kind of agent and the mechanism by which it recognizes instantiations of that universal. If we only allow physical agents (agents physically possible in this our world) as candidates, we will severely restrict the kinds of universals that exist: only 'constructive' or 'effectively decidable' universals would exist. This isn't enough for real mathematics (I am no intuitionist or constructivist). So I want to admit more or less idealized agents (somewhat like the ideal constructor in Shapiro 1997). Thus, we might say things like: "Suppose this agent can handle infinitely long lists of natural numbers, even if they don't have any (finite) characterization; i. e., suppose he can handle arbitrary subsets of the natural numbers." We assume that our ideal agent can recognize certain kinds of patterns we ordinary agents cannot recognize; based on that assumption we can research what must be the case for these kinds of pattern. The more idealized this agent is, the less well we know what we are really talking about, the less grasp we have of the concepts thus introduced, the more dubious is the knowledge thus obtained. But that isn't out of the ordinary: usually we know very well what is right in front of our noses, and we can be less certain about matters farther away in space or time – or in abstraction. Some patterns we just perceive (and even then there is room for mistakes), others are gradually more inferred. This seems to be a handy and flexible account of existence for universals.

As to the intensional aspect of universals: If we specify an agent – or maybe rather just a 'recognition mechanism' which could be used by, or be part of, an agent – that can recognize a certain putative universal, we thereby specify 'the way in which this universal is given', its intension.⁵ Take the standard example of Hesperus and Phosphorus. What is the intension (the Fregean *Sinn*) of "Hesperus"? Something like "the first star visible in the evening". Does this phrase completely specify the intension of "Hesperus"? Only if we assume that the intensions of the words occurring in the

³For part of my account of agents and pattern recognition see my 2004a, Sections 3 and 4.

⁴Whatever *that* way of existing amounts to – ordinary concrete particulars must be explained as well.

⁵But perhaps talking about *the* intension of the universal is too rash; I suspect that there is rather a continuum of intensions for any given universal, depending on the amount of detail with which we specify the corresponding recognition mechanism. Wait and see.

phrase, and the intension of the way they are composed, are themselves known and in no need of further specification. But we could have made a similar assumption right at the outset by saying that the intension of the word “Hesperus” itself is clear and known and in no need of further specification. It is better also to specify the intensions of “star”, “first”, “visible”, and so on. But for any level of linguistic analysis of the intension of “Hesperus”, there might be a deeper level, giving a more fine-grained analysis. Finally we reach levels where words start to fail us, where explicit definitions aren’t available any more, either because there are no terms more general than the ones we want to explicate or because we move in explicatory circles, relying on some of the terms we want to analyze. So the intension of a phrase can be elucidated to some degree by adducing other phrases, but in the end this method has to rely on certain intensions’ already being known. As long as we rely on language only, something remains hidden.^{6,7}

There is the alternative of giving, instead of more words, a *method* of veri-, falsi-, or identification. My proposal is at least very close to this; I’m not yet sure about whether it mightn’t be the same, and if it isn’t, why my proposal is better. For one thing, specifying a method is done by using words, and thus depends on language too; but then, so does specifying a recognition mechanism, if we don’t specify it by presenting an exemplar. On the other hand, both these alternatives to straightforward explication via words have the advantage that the words they must rely on are not those that are to be explicated, or ones akin to them. This is a reappearance in linguistic guise of the point that ‘founding’ is hopeless and that all we can hope for is the *linking* of concepts less well understood to concepts somewhat better understood.⁸ Anyway, my central motivation for wanting meanings specified by specification of recognition mechanisms is that this gives a neat solution for the grue-problem: “green” is a more natural property than “grue” because the recognition mechanism for “green” is simpler than the one for “grue”; the latter must contain recognition mechanisms for “green” and for “blue”, and, besides, a clock which recognizes the date for switching between recognizing green and recognizing blue (or a mechanism that recognizes whether a given emerald/object has been first inspected before time *t* or after *t*).

Levels of detail in the specification of recognition mechanisms: Suppose that we present a certain recognition mechanism to specify the meaning of a general term, the intension of a universal. What *type* of mechanism do we intend? How much latitude do we allow for realizations of that mechanism? If we describe the mechanism in language then the description can be supposed to contain exactly what is characteristic of that mechanism. If instead we put an exemplar of the mechanism

⁶A further complication is added by linguistic division of labor; cf. Putnam 1975.

⁷Of course, if I am right then there is always something which must remain hidden from explication, because there is always something that must be presupposed. But I hope that on my account there is less that remains hidden, and what is shown is maybe shown in a more useful way.

⁸But how about words like “camera”, which might in fact occur in a description of a recognition mechanism for cameras? I think this circle isn’t vicious, like the hermeneutic circle, or the technological circle in which mankind uses tools to produce ever more sophisticated and precise tools. – A similar analogy is yielded by the comparison to metamathematics, where mathematical concepts and methods are applied to mathematical practice itself. The early formalists hoped to ground classical mathematics in indubitable empirical, perceptual truths about possible rule-governed manipulations of physical symbols in formal systems. But, as Stephan Körner (1960, Sect. V.1, pp. 101–6) argues and I agree, this interpretation of metamathematics is incorrect, because actual physical symbols and symbol-manipulations do not necessarily always conform to the stringent demands of proof theory. So, proof theory and metamathematics aren’t different in kind from, or more certain than, ordinary mathematics. But *nevertheless* mathematics has profited very much from metamathematical investigations.

in front of our audience there is the question of how much detail we require other exemplars to share with the one at hand. Do they have to be atom-for-atom replicas? Is it enough that the parts come from the same production line? Or could we even take parts from an altogether different manufacturer which work in a more or less similar fashion?

Another, more plausible approach to the same problem: You and I, we both have a certain understanding, say, of the word “red”. When should we say that the word has the same meaning for us? It has the same meaning for us insofar as we use the same recognition mechanism for recognizing (instantiations of) redness. But certainly our two mechanisms (our visual apparatuses) won’t be identical down to the submicroscopic level, even if we were identical twins. One might say that “red” has the same meaning for us if we call the same things red and the same things non-red, i. e., if “red” has the same extension for the two of us. But how could this be verified? By looking at what we have actually called red in the past? Then there would be room for mistaken identifications of our understandings of “red”, because future cases might reveal a difference; and anyway, you or I might have had a different understanding of “red” in the past from the one we have now. So what we really have to consider are all *possible* cases in which we decide whether something is red or not. And how do we know about possible but counterfactual cases? By examining our respective recognition mechanisms and extrapolating how they would react under the counterfactual circumstances.

Recognition mechanisms never fit the intended meaning perfectly; even in the most sophisticated ones and even discounting malfunction there is always the possibility of mistakes.⁹ Consequence: We must specify whole agents, which have a primary function/goal. By looking at what the recognition mechanism’s function for the agent is we can tell what it is intended to recognize, and that is the meaning the recognition mechanism represents. Even then there may be the possibility of some inscrutability of reference, but hopefully the differences between interpretations will be ones that don’t make a difference.

Back to the problem of sameness of intension: If our recognition mechanisms aren’t perfect mirror-images of each other – which with near-certainty they won’t be – then there are necessarily circumstances under which they would react differently, where you call something red and I don’t. Thus for no two agents will “red” have the same meaning. Such a version of sameness of meaning is too narrow. But we can put down some of these divergences to mistakes, to malfunctions of the mechanisms, thus counting the *intended* reactions of our mechanisms instead of the (counter)factual ones. Still, I suppose, there would be more nonsynonymity than we want? Anyhow, I believe that there is no natural limit to be drawn for the level of detail of agreement at which we count two mechanisms instances of the same kind of mechanism. The moral would be that intensions can have varying levels of finegrainedness, none of which is ‘the correct level’. (???)

The world is structured, patterned; it instantiates certain universals. We don’t know completely what the structure of the world is – that would mean being omniscient. But to some degree we recognize what the world is like. Some of the patterns we believe the world, or parts of it, to instantiate may not be instantiated 100 % perfectly. For example, the door to the room I am sitting in is rectangular, but not perfectly so. In classifying it as rectangular I am not 100 % correct, but approximately correct, correct

⁹Cf. Dennett about semantic vs. syntactic engines in “Three Kinds of Intentional Psychology” (Dennett 1987, 61).

enough for everyday purposes (cf. Dennett 1991): treating the door as rectangular works very well for everyday purposes.

Connection between epistemology/pattern recognition and ontology? The epistemological approach is used to clarify our concepts of universal, particular, and exemplification (furthermore: of state of affairs, of function/mapping, of set in the sense of arbitrary collection, of meme, of possibility/necessity, of probability, of causation – I hope). With the ‘linguistic turn’, people attempted to do this by looking at how we use the corresponding terms. That’s not good enough, because it leaves the nonlinguistic animals outside our scope. They, too, can recognize patterns; they, too, can have beliefs and think (in some way); they, too, can have concepts (in some way); so all this doesn’t reduce to the way an agent uses his language. What is needed is a ‘teleosemantical turn’, which is what I propose. Representations get their content, their intentionality, from their functions in the lives of the agents having them. The slogan would be, “Meaning is function”.

Looking at how agents can recognize patterns is primarily important for understanding our manifest image, or for descriptive ontology: for describing how we ‘carve nature’, regardless of how nature in fact *is*. But if we understand what functions the concepts of, e.g., universal, particular, exemplification and existence have in our lives, or rather what function the underlying way of carving nature has, then we can also revise those concepts, i.e., introduce explications of them which will make them serve these functions better. If we know better what we should mean by “existence”, then we can make better-founded and more illuminating judgments about what actually exists.

Another attempt to clarify the connection I see between epistemology/pattern recognition and ontology: The different ontological categories are like natural kinds; the distinctions between them are some of nature’s joints. But they are natural kinds which are more akin to colours than to wavelengths. Wavelengths are very natural kinds, colours are somewhat less natural kinds: to characterize colours, you have to refer to a particular (natural) kind of sensory apparatus, e.g., the normal human visual apparatus. (So, if we want to be precise, we shouldn’t talk about colours *simpliciter*, but rather about human-colours, bee-colours etc.) Since a natural kind of sensory apparatus carves nature in this way, this way of carving nature is a natural, if derivative, one.

Now, if we look at our usual way of carving nature, where we see tables and trees and persons, this is perhaps a less than perfectly natural way of looking at the world, too. Maybe it would be more true to nature to conceive of it as an immense cloud of interacting particles, or of interweaving probabilistic quantum waves, without the sharp boundaries we tend to ‘see’. But this more correct way of carving nature is next to impossible to realize for us finite physical agents. The phenomena we are able (and need) to perceive/recognize and react to can’t be extremely complex or small or large or far away. And the simpler the agent, the simpler and fewer are the things she can recognize. Therefore the first ‘entities’ which are recognized by agents in the course of the phylogenesis of recognition/intentionality are states of affairs, then come substances (in the sense of “kinds of stuff”, like chemical substances) and kinds of things, then particular things and their properties.¹⁰ This should hold not only for normal human beings but for physical agents of every kind. (Although the particulars and stuffs most salient for beings living inside suns or on the surfaces of neutron stars may of course be quite different from those familiar to us.) Therefore,

¹⁰See Sect. 4 of my 2004a.

the relativization necessary to see our ordinary ontological categories as derivative natural kinds is weaker than the one in the case of colours.

I believe that states of affairs, propositions, and other good abstractions (also some less good abstractions like tropes – to be able to recognize a trope is just to be able (a) to recognize the corresponding particular as *that particular* particular, and (b) to recognize the corresponding universal) exist in more or less the same way as universals exist. The traditional ontological squabbles about which kind of entity really exists, or is more fundamental, are misguided. They are at best useful as examinations about which of many different valid ways of *describing* the world by choosing some kind of entity (and corresponding ‘meta-universals’, and corresponding semantics for ordinary language¹¹) as basic, works better for a given purpose.

One might think that my characterization of universals as recognizabilia is too narrow: supposedly there are universals which are not even recognizable in principle. We’ll have to see about that; I think idealization of agents will take care of it. Furthermore one might think that my characterization is also too broad: universals aren’t the only entities (some of) which are recognizable; particulars are recognizable too. Against this I would say that what is really recognized in the recognition of particulars are again patterns, universals. We recognize some part of the world as this or that particular by recognizing it as an instantiation of some universal which is characteristic of that particular. Indeed I would say that instantiation of certain characteristic universals is what *makes* some part of the world be the corresponding particular. (There are difficulties with objects which change ‘beyond recognition’ during their lifetime, e.g., people.)

I am here not thinking of haecceities, individual essences, ‘thisnesses’, which cannot be instantiated more than once. It is possible that some universal which under normal circumstances would be characteristic of the particular *p* happens to be instantiated more than once, or that different universals which under normal circumstances would both be characteristic of *p* happen to be instantiated by quite different parts of the world (e.g., the ship of Theseus): our identity criteria for certain kinds of particulars can break down under unnormal circumstances. (And the farther technology develops, the more such unnormal circumstances become realistic possibilities: for science-fiction examples, use brainwashing, brain surgery, genetic alteration, implantation of false memories, variations on beaming; cf., e.g., Lem 1971.) Then there will be no fact of the matter as to which of the instantiations is ‘really’ *p*, or rather, there won’t be just a single *p* anymore.

Ordinary particulars also may have vague or fuzzy boundaries in time and/or space. This again creates difficulties for the standard conception of particulars or of existence.¹² Ordinary concrete particulars are supposed to occupy specific regions of space at any moment of their existence. But if *p* has a fuzzy boundary in space then there are points in space for which there is no fact of the matter whether *p* occupies them or not. Some points are definitively outside of *p*, others are definitively inside, but for some points both verdicts would be to some degree arbitrary. Large objects like mountains are obvious examples for this phenomenon, but this kind of fuzziness also applies to seemingly sharply-bounded objects like, say, diamonds. At the atomic level their borders are a little like clouds, with pieces flying away and others settling down, and there is no sharp distinction between still being connected to the crystal,

¹¹See my 2004b.

¹²Cf. Unger 1980, Lewis 1993.

however loosely, and just being very close to it. Even if this happens only infrequently there will at least be short periods of time when the object's boundary isn't sharp.

If p has a fuzzy boundary in time, say, a fuzzy beginning (endings are symmetrical), then there is no point in time before which p doesn't exist and after which p exists. Rather, p comes into existence gradually: it is not there at all, it is there a little, it is there to a higher degree, and at some point it is there in the full sense. And there aren't even points in time at which p 's 'degree of existence' changes from 0 to above 0, or from below 1 to 1 (I am talking about real vagueness, not fake vagueness). Degrees of existence are of course unacceptable to standard accounts. But with scientific progress we learn more and more that ordinary concrete objects have vague beginnings and endings (e.g., human bodies or human life). If we look closely enough, what seemed like a sharp, discontinuous transition is revealed to be a gradual change. Then attempts follow to identify some precise point in this process which is the true coming into, or going out of, existence; but these are usually beset by arbitrariness, and the proposed points anyway resolve to fuzzy intervals again at still closer scrutiny.

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